Lat 41.15335 Lon -122.44735

United States Department Of Agriculture | Forest Service | Shasta-Trinity National Forests

Reply To: 3420 Date: June 1, 1989

Subject: Evaluation of Red Fir Dwarf Mistletoe in Horse Heaven Sale, Mt. Shasta RD (Report No. N89-12)

To: Forest Supervisor, Shasta-Trinity NFs

On May 22, 1989, Dave Schultz, Entomologist, and I met with Paul Finke, Small Sales Officer, Mt. Shasta Ranger District, to examine a red fir stand in the Horse Heaven sale area (T. 38 N., R. 5 W., section 16). Branch mortality of the red fir leave trees had become more conspicuous following the 1988 logging activity in the stand. The District was concerned about the future of this stand, especially the advanced regeneration red fir on the site.

The overstory is comprised principally of scattered red fir. Some Douglas-fir and white fir are also present. Most of the ponderosa pine and white pine overstory has been harvested. Red fir, white fir, Douglas-fir, white pine, and lodgepole pine make up the understory in decreasing order of occurrence. Dense clumps of seedling to pole-size red fir occur in the understory. Manzanita is the most common shrub. Site quality was estimated as site class II or better.

The main pest in the stand is red fir dwarf mistletoe, Arceuthobium abietinum f.sp. magnificae. Heavy infections in the overstory red fir are causing most of the branch mortality. Some dwarf mistletoe infections may also have Cytospora cankers (caused by Cytospora abietis) which accelerate branch mortality. Many of the understory red fir also have branch and bole infections of dwarf mistletoe. Red fir is the only host of this mistletoe in this stand. White pine blister rust (caused by Cronartium ribicola) is present on white pines up to pole-size in the stand.

MANAGEMENT ALTERNATIVES

1. No Action. Additional dwarf mistletoe infection of the red fir understory from overstory infections will occur annually. This will maintain a high infection level throughout the crowns of understory trees. Growth of affected trees will be reduced and some will be stunted and deformed. Dense stocking will contribute to a reduced rate of growth of all species. Some tree mortality, both in the overstory and understory, will occur because of heavy dwarf mistletoe infection levels and associated insect activity. Branch mortality will decrease following the return of adequate precipitation levels, but the effects of dwarf mistletoe will not disappear. During periods of below normal precipitation, branch and tree mortality can be expected to increase. Trees, especially red and white fir, wounded during the 1988 logging activity will experience loss of wood volume from decay. The site will not produce wood volume at levels projected by yield tables.

2. Regenerate Site. The remaining trees on the site would be removed and the site would be planted. A mix of species would be appropriate. Regeneration of white pines should be limited to no more than 10 percent because of blister rust, unless rust resistant stock is available for the site. In any areas where bordering stands have dwarf mistletoe in red fir, a buffer of non-hosts should be planted. This buffer should be 100-150 feet wide. This stand is adjacent to a new clearcut unit. Removal of this stand would probably result in exceeding current standards for size of openings. There may be difficulties in achieving successful regeneration of certain species in such a large opening.

A variation of this alternative would be to leave this stand undisturbed until the adjacent opening meets the standard for being stocked and is no longer classified as an opening. Then this stand could be cleared and regenerated without exceeding standards. Delaying harvest of this stand more than 10-15 years would increase the likelihood of dwarf mistletoe infection spreading into the adjacent regenerated stand.

3. Remove Overstory and Thin Understory. Overstory red fir would be harvested. Although only dwarf mistletoe infected trees need to be removed, the level of infection in the stand is sufficient to expect that most overstory red firs are infected and would require removal. Other overstory tree species do not need to be removed to reduce the effect of dwarf mistletoe, but it may be advisable to do so to reduce their effect on the growth of the new stand. If there is need to retain any overstory red fir on the site for snag recruitment, this can be accomplished by girdling these trees and leaving them stand. These dead trees will not be a dwarf mistletoe hazard to the stand following their death.

After overstory removal, the advanced regeneration may require a precommercial thinning for the red fir to achieve sufficient growth to outgrow the upward advance of dwarf mistletoe in their crowns. The first criterion for selecting a red fir as a leave tree should be the amount of live crown. When selecting leave trees in clumps of red fir, those with heavy dwarf mistletoe infections, bole infections, or bole wounds should be removed. Larger, non-merchantable red fir that stand above most surrounding red fir may need to be removed if they have dwarf mistletoe infections in their upper crown that may serve as a source of infection of the surrounding trees, even if they are satisfactory trees under other criteria. White pines without blister rust or only non-lethal blister rust infections should also be retained, but their presence should not be included in determining the occurrence of adequate minimal stocking.

Prior to implementing this alternative, a careful survey of the understory is necessary to ensure that adequate acceptable regeneration will remain on site after harvesting. An estimate of the amount of overstory to be removed will also be helpful in determining whether an acceptable understory will remain after harvest. If the overstory volume is too high (>20 mbf/ac), its removal will likely result in unacceptable levels of damage to the advanced regeneration.

Part of the Horse Heaven sale adjacent to the stand discussed above was cleared and will be site prepared this year. Clumps of pole-size red fir were left in this unit as advanced regeneration. Most of the trees are infected by dwarf

mistletoe and pose a hazard to red fir regeneration planned for the site. Two alternatives are available. One is to remove the remaining red fir on the site during site preparation. The second is to leave the clumps and regenerate non-host species around them for a distance of 50-75 feet to reduce the chance of infection. Some thinning of the clumps should also be done to increase tree growth and to remove trees with unacceptable crowns, damage, or other undesirable characteristics.

If you have any questions about this evaluation or require additional assistance, please contact Dave Schultz or I at (916) 246-5101.

/s/ Gregg A. DeNitto

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